

Claims

What is claimed is:

1. A particulate adsorbent comprising particles comprising:

- (a) at least one core comprising a transition metal-containing component comprising superparamagnetic materials, low Curie Temperature materials, and mixtures thereof, and
- (b) a siliceous oxide coating on the surface of said core(s),

wherein said coating covers the entire surface of said core(s) such that said adsorbent particles have a transition metal leach value when present as 0.33 g dried adsorbent particles in 20 ml of 1N hydrochloric acid aqueous solution for 15 minutes of less than about 50 ppm metal based on the weight of said solution.

2. The adsorbent of claim 1 wherein said transition metal is selected from Group VIII transition metals and mixtures thereof.

3. The adsorbent of claim 2 wherein said transition metal-containing component is selected from the group consisting of iron, iron oxides, and mixtures thereof.

4. The adsorbent of claim 3 wherein said transition metal-containing component consists essentially of magnetite.

5. The adsorbent of claim 1 wherein said siliceous oxide coating contains hydroxyl groups on its outer surface.

6. The adsorbent of claim 5 wherein said siliceous oxide coating containing hydroxyl groups on its outer surface consists essentially of silica.

7. The adsorbent of claim 1 wherein said siliceous oxide coating contains externally accessible porosity.

8. The adsorbent of claim 7 wherein said particles contain at least about 0.2 ml/g pore volume measured by nitrogen BET method based on the total dry weight of said particles.

9. The adsorbent of claim 1 wherein said particles have a surface area of at least about 30 m²/g measured by nitrogen BET method based on the total dry weight of said particles.

10. The adsorbent of claim 1 wherein said core forms at least about 50 wt.% of said particles based on the combined dry basis weight of said core and said oxide coating.

11. The adsorbent of claim 10 wherein said core forms at least about 60 wt.% of said particles based on the combined dry basis weight of said core and said oxide coating.

12. The adsorbent of claim 1 wherein said core comprises one or more crystals having a crystal size of about 100 nm or less.

13. The adsorbent of claim 12 wherein said crystal(s) have an average crystal size of about 60 nm or less.

14. The adsorbent of claim 1 wherein said adsorbent particles have an average particle size of about 1-15 μ m.

15. The adsorbent of claim 14 wherein said adsorbent particles have an average particle size of about 3-10 μ m.

16. The adsorbent of claim 1 wherein said core is a superparamagnetic material at room temperature.

17. The adsorbent of claim 8 wherein said particles contain at least about 0.2 ml/g porosity in pores having a diameter of 60 nm or greater as measured by nitrogen BET method.

18. The adsorbent of claim 16 wherein said superparamagnetic material has a remanent magnetism level of about 10 emu/g or less.

19. The adsorbent of claim 1 wherein said core(s) consists essentially of a material having a Curie Temperature of about -50°C. to 100°C.

20. The adsorbent of claim 16 wherein said superparamagnetic material has a remnant magnetism level of about 2 emu/g or less.